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(2) Secondary deposits consisting of asphaltum, have a vertical range from Miocene to Pleistocene. (Calif. State Min. Bur. Bull. 11, [1896] 1897).

BOTANY.[1]

A Scientific Dictionary of Plants.—Of unscientific dictionaries of plants we have had many, but at last we have one which may be consulted without fear by the scientific botanist. It is so useful that we may well call attention to it here. Its author, J. C. Willis, is the Director of the Royal Botanic Garden in Ceylon, and the book, which he calls "A Manual and Dictionary of the Flowering Plants and Ferns," is the outgrowth of his experience in garden, museum and field. In the first volume are given summaries of Morphology, Ecology, the Principles of Classification, Geographical Distribution, and Economic Botany. The second volume, which is double the size of the first, consists of an alphabetical arrangement of classes, orders and genera, each with valuable descriptive and numerical data.

In the preparation of the work the author has made use of Engler and Prantl's *Pflanzenfamilien*, thus insuring a modern treatment. The fact that it is brought out by the Cambridge University Press as one of the Cambridge Natural Science Manuals, is a sufficient guarantee of the mechanical excellence of the work.

—CHARLES E. BESSEY.

Order and Family in Botany.—It has been a well-recognized law in Zoology that "Family" is a subdivision of "Order," and in many botanical publications an effort has been made to recognize the same relation. It is very unfortunate that in the ordinary English books both of these terms have been applied to the same groups. Thus we have Order *Ranunculaceæ* and Family *Ranunculaceæ*, Order *Compositæ* and Family *Compositæ*. Here we throw away a much needed group-term, and are obliged to bring in the term "Cohort" to replace it, to say nothing of "Series" and "Division." Some of the German botanists have wisely followed the zoological practice of using "Order" for a group above "Family." Thus Luerssen (*Handbuch der Systematischen Botanik*), Sachs (*Text-book of Botany*), Goebel (*Outlines of Classification and Special Morphology of Plants*), Schumann (*Lehrbuch*

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der Systematischen Botanik) Winter, Luerssen, Limpricht and others (*Rabenhorsts's Kryptogamen Flora von Deutschland, Oesterrich und der Schweiz*), Schroeter (*Die Pilze Schlesiens*) and Engler and Prantl (*Die Natürlichen Planzenfamilien*) group the families (*Familien*) under orders (*Ordnungen, Reihen*). Over against this commendable practice we may contrast the common English and American manuals, as Hooker's *Student's British Flora*, Bentham's *Handbook of the British Flora*. Gray's *Manual of Botany*, Coulter's *Manual of Rocky Mountain Botany*, Watson's *Botany of California*, and Bentham and Hooker's *Genera Plantarum*, in all of which Order and Family are treated as synonymous terms. Now and then we find a work in which these terms are treated as not synonymous, but, curiously, Family *is placed above Order*. Twenty or more years ago, Cooke, in his Handbook of British Fungi, used these terms in this reversed relation; but little was thought of it since he never paid much attention to such details. Recently a work has appeared (Warming's *Handbook of Systematic Botany*, translated by Potter) which is so useful in many ways that it must be widely used, in which the orders are made secondary to the families. Thus we find the "Family" *Gasteromyceteœ* containing the "Orders" *Tylostomaceœ, Lycoperdaceœ, Sclerodermataceœ, Nidulariaceœ* and *Hymenogastraceœ*, the "Family" *Saxifraginae* containing the "Orders" *Crassulaceœ, Saxifragaceœ, Ribesiaceœ, Hydrangeaceœ, Pittosporaceœ, Hamamelidaceœ, Platanaceœ* and *Podostemaceœ*. We hoped that this confusion would find no foothold in America, but we observe that Thaxter in his great *Monograph of the Laboulbeniaceœ* follows the undesirable practice by subdividing the Family *Laboulbeniaceœ* into three "Orders."

It should not be necessary to argue for uniformity of practice in the two branches of Nature-study, Botany and Zoology; that appears to be almost self-evident; but these later exceptions show that there is danger that we shall have more and more cases of violation of the rule. It is not a matter of small moment. It is not true that botanists may be a law unto themselves in such matters. Every man, however much he may have deepened his work until he may be said to have mastered some particular field of the science, must remember that to a large extent his work must be followed and reviewed by men who, for a time, at least, work in more than one field. Every biological student has a right to demand that specialists shall not add needlessly to the difficulties which confront him in his attempts to gain a knowledge of the scientific grouping of plants and animals. So long as the botanists used "Order" and "Family" indifferently for the same groups, the student had little difficulty in remembering the curious fact that while botanists have as great a need as the zoologists for group-terms, they have thrown away " Family " by making " Order " synonymous with it and then using both terms for the same groups. When, however, he faces the fact that in zoölogy the sequence is Class, Order and Family, and in botany Class, Family and Order, he may well become indignant at the want of agreement between the workers in these nearly related fields of science.—CHARLES E. BESSEY.

Botanical Notelets.—Frank Vincent's " Plant World " is a pleasantly written book in Appleton's Home Reading Books. It consists of selections, prose and poetic, relating to plants. In general these selections are judiciously made, but there is one at least written by I. Platt in " The World's Encyclopedia of Wonders and Curiosities " which should at once be suppressed by the publishers. How Dr. Harris, the editor of the series, could have allowed such arrant nonsense to go into this otherwise excellent book is quite inexplicable.

Of some botanical interest is the pretty little book, " The Dahlia," edited by William Cuthbertson, and published by Macmillan & Co. While primarily intended for gardeners and florists, there is not a little of value in it for the scientific botanist who is interested in the question of the pliability of plants under man's hand.

J. B. Leiberg's report of his botanical survey of the Coeur d'Alene Mountains, Idaho, in the summer of 1895 (Contrib. U. S. Natl. Herb., Vol. V, No. 1), brings to light many interesting facts about a relatively little known region. It contains many suggestions as to the policy of forest preservation in which so many scientific men are now interested. It is interesting to note that in spite of the fact that this report has a marked economic flavor, all measurements are metric throughout. Certainly if the United States Department of Agriculture can safely use the metric measurements in a bulletin dealing with topography, drainage, climate, mineral deposits, agricultural capacity, agricultural products, grazing lands, native food plants, utilization of water supply, forest resources, forest destruction, forest preservation, etc., botanists need no longer fear to make use of such measurements in their books, even of the most popular character.

The last number of Pringsheim's *Jahrbucher für wissenschaftliche Botanik* (Bd. XXX, 2 and 3), now edited by Pfeffer and Strasburger, is remarkable for the richness of its contents, the whole being devoted to cytological studies from the Botanical Institute of Bonn. After an introductory note by Strasburger there are papers on the karyokinatic spindle of Equisetum (Osterhout), nuclear division in the pollen-mother-cells of certain Dicotyledons and Monocotyledons (Mottier), nuclear division in the pollen-mother-cells of *Hemerocallis fulva* (Juel), nuclear division in *Chara fragilis* (Debski), nuclear division and free-cell-formation in asci (Harper), nuclear division and fertilization in *Basidiobolus ranarum* (Fairchild), nuclear- and cell-division in the *Sphacelariaceæ* (Swingle), nuclear division and fertilization in *Fucus* (Strasburger), cytoplasm-structure and nuclear- and cell-division (Strasburger), fertilization (Strasburger). It is encouraging to observe the names of the American botanists, Osterhout, Mottier, Harper, Fairchild and Swingle in this list.—Charles E. Bessey.

ZOOLOGY.

Stichospira paradoxa.—Nov. gen. and sp. of *Ciliata Infusoria* with plate.—Body, when extended, much elongated, consisting of a bulbous posterior part, a long, slender neck, and an anterior part with the peristome and a long corkscrew-like anterior extension curved dorsalward and to the right, bearing the prolongated adoral zone of cilia. When contracted, it is obovoid with the anterior end rather pointed. The substance of the body is slightly yellow. One contractile vacuole is situated in front of the peristome, somewhat to the left and dorsalward, another near the posterior end of the body. Two almost globular endoplasts were seen not very distinctly. In the posterior part there are, as a rule, numerous food-balls and small, strongly-refracting particles. On the right margin of the rather deeply excavated peristome is a broad, thin, hyaline membrane, standing out perpendicularly, ventralward; it appears to be rather stiff and is undulating very slightly (*u m* in fig. 2.). The anus is in the anterior part, to the left of the peristome, and constant. Of cilia there are the following:—

1. The adoral zone with about 30 to 50 transverse series of fine, long cilia from the peristome-angle to the anterior end of the processus, of which this zone is occupying the outer side.

2. One single, stronger, shorter cilium at the anterior end of the zone, and sometimes a smaller one in front of it.

3. A series of about 20 " paroral " cilia just inside of the membrane on the right peristome-margin; they are long, bristle-like, crowded, appearing stiff, but slightly vibrating, longest in the middle of the series, their ends forming a regular curve.